LISTING OF AND AMENDMENTS TO CLAIMS:

1. (currently amended) A method for forming a bilayer of tantalum nitride and tantalum on a substrate, the method comprising:

depositing a first layer on the substrate by plasma enhanced atomic layer deposition of a tantalum halide precursor in the presence of a plasma containing hydrogen and nitrogen; and

reducing concentration of nitrogen in the plasma to zero so that a substantially nitrogen free second layer of tantalum is formed;

wherein the depositing comprises:

a. exposing the substrate to the tantalum halide carried by an inert gas;

b. exposing the substrate to the plasma; and

c repeating a. and b. approximately 40 - 800 times until a desired thickness of the first layer is obtained.

2. (previously presented) The method as recited in claim 1, further comprising varying concentration of nitrogen in the plasma to thereby vary the amount of nitrogen in the first layer.

3. (previously presented) The method as recited in claim 2, wherein the concentration of nitrogen plasma is varied so that the first layer has a nitrogen to tantalum concentration ratio of between 0 and 1.7.

4. (canceled).

5. (canceled).

6. (previously presented) The method as recited in claim 1, wherein the bilayer is used as a diffusion barrier for copper.

7. (original) The method as recited in claim 5, wherein said second layer is deposited upon said first layer.

8. (original) The method as recited in claim 1, wherein temperature of the substrate is between 100 °C and 450 °C.

9. (original) The method as recited in claim 1, wherein temperature of the substrate is 300 °C.

10. (canceled).

11. (previously presented) The method as recited in claim 1, wherein the bilayer is deposited on a substrate selected from the group consisting of silicon, silicon having a layer of silicon dioxide on the silicon, and a porous substrate.

12. (original) A method as recited in claim 11, wherein the substrate is a low dielectric constant substrate and has a dielectric constant in the range of 2.0-3.0.

13. (previously presented) A method as recited in claim 11, wherein the substrate has copper conductors, and the bilayer serves as a diffusion barrier for said copper.

14. (original) A method as recited in claim 1, wherein the tantalum halide is tantalum pentachloride.

15. (canceled)

16. (currently amended) A method as recited in claim 15, wherein the exposing ~~the~~ of the substrate to the tantalum halide carried by the inert gas is performed at a pressure of 3.0×10^{-2} Torr.

17. (original) A method as recited in claim 15, wherein during the exposing of the substrate to the hydrogen and nitrogen plasma, partial pressure of hydrogen is 2.5×10^{-2} Torr.

18. (canceled)

19. (original) A method as recited in claim 15, wherein the exposing of the substrate to the tantalum halide carried by the inert gas is carried out for approximately 2 seconds; and the exposing of the substrate to the hydrogen and nitrogen plasmas is carried out for approximately 5 seconds.

20 - 25. (canceled).

26. (previously presented) The method as recited in claim 1, comprising switching off a source of nitrogen to reduce said concentration of nitrogen in the plasma to zero.

27. (previously presented) The method as recited in claim 1, wherein the first layer and the second layer are sequentially deposited while the substrate is in a chamber by switching off a source of nitrogen to thereby reduce said concentration of nitrogen in the plasma to zero.

28. (previously presented) The method as recited in claim 1, wherein the second layer of tantalum comprises amorphous tantalum.